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ABSTRACT

Fifteen behavioral indices derived from information gathered by the National Center for Health Statistics Health Examination Surveys Cycle II (with a sample of 7,119 six to eleven year old children) and III (with a sample of 6,768 twelve to seventeen year old children) were investigated for differences related to the age of the mother of the examinee. Thirteen indices were significantly related to teenaged motherhood, mothers' age throughout the range, or both. When correlated social and family variables were controlled, only two variables retained a significant unique relationship with teenaged motherhood. Four others were uniquely related to maternal age net of social and family variables. Findings on the behavioral measures were compared to findings on IQ. Among conclusions were that children of teenaged mothers are at a small disadvantage, not only intellectually but behviorally as well. (Author/SBH)

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Intellectual and Behavioral Status of Children Born to Adolescent Mothers

Paper presented to the American Psychological Association
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Abstract

15 behavioral indices derived from information gathered by the National Center for Health Statistics Health Examination Surveys Cycle II and III were investigated for differences related to the age of the mother of the examinee. Thirteen indices were significantly related to teenaged motherhood, mothers' age throughout the range, or both. When correlated social and family variables were controlled only two variables retained a significant unique relationship with teenaged motherhood. Four others were uniquely related to maternal age net of social and family variables. The findings on the behavioral measures are compared to findings on IQ.

The present study is part of an investigation into the outcomes of teenaged motherhood for the offspring. This work is based on analysis of data gathered in three large projects (See Table 1). Cycle II of the Health Examination Survey conducted by the National Center for Health Statistics in 1963-1965 gathered data from a number of sources on a national sample of 7119 children ages 6-11. Our analysis was based on the 6577 nonhispanic white or black children for whom information on maternal age at birth was available from birth certificates. Cycle III of the Health Examination Survey examined 6,768 youth ages 12-17. Our analysis was based on the 5944 nonhispanic white or black children with the required birth certificate information. These data were gathered in the years 1966-1970 and also constituted a national sample. The third data source was the Collaborative Perinatal Project of the National Institute of Neurological and Communicative Disorders and Stroke. Data were collected on over 53,000 children whose mothers attended a prenatal clinic in one of the 13 participating hospitals located in cities predominately but not exclusively in the Eastern part of the country. We conducted the present analyses on the 26133 children who were followed up through their seventh year of age, were the first child in a family to enter the study, and were not Spanish speaking or of Oriental background.

The focus of this study is the natural mother's age at the birth of this child as reported on the birth certificate. The children of teenaged mothers are not necessarily first borns, nor are they necessarily living with their natural mothers at the time

of the examination. Since our findings on children's IQ are reported in full elsewhere I will only briefly review them here. Furthermore, I will concentrate on the Cycle II and III data. The CPP findings in no way contradict any of our conclusions, however the behavioral data in the CPP was limited to observations during the psychological testings and thus is really not comparable to the NCHS data.

The raw differences in IQs of children born to mothers of differing ages are presented in Table 2. As can be seen, children born to teenaged mothers did score lower on the average than children born to older mothers, children of mothers age 14-17 being 5 to 7 1/2 points lower on IQ than the average. IQ's tended to increase as mothers were older until the oldest mothers whose children performed somewhat more poorly, but not as poorly as those of teenaged mothers. Note that the data here are all for white children. Although the conclusions we have reached in this study seem to be equally true for black and white children the overall race difference, the smaller numbers for blacks, and the larger porportion of teenaged mothers among the black children tend to confuse the picture, therefore the raw data here is for the larger sample of white children only.

Given the known association between young motherhood and lower socioeconomic status we were not surprised at this zero order difference. The question we wished to answer was whether there were effects of young parenthood on children which were <u>not</u> accounted for by social and demographic variables. We therefore turned to multiple regression analysis to examine the <u>net</u> effect

of maternal age. In these analyses we examined four functions of maternal age: young teenaged motherhood (under 18 years), older teenaged (18-19 years), overall linear maternal age, and maternal age squared (in order to pick up a relationship represented by a curved line). The quadratic term was not significant, therefore it is omitted from the remainder of this presentation.

Our general approach to data analysis has been to examine the contribution of sets of variables to the equations estimating child characteristics. Thus we attempted to minimize our Type I errors. The sets of variables we examined are presented in Table 3 along with the numbers of variables in each set. For example, the regional set consists of three dummy variables representing the Northeast, South, Middle West and West. Some sets include missing data vectors, others include special functions representing hypothetically important variables such as 'only children.' We also examined the curvilinear effects of some variables, such as income.

In addition we wished to be able to identify variables which interacted with maternal age in their prediction of offspring characteristics. Thus we examined each of the other sets in interaction with maternal age. Although one or two of these sets seemed to produce significant effects two considerations led us to reject them as substantively useful. First, the effects were trivially small (recall the high power) and were "significant" at a rate more or less consistent with chance. Second, and more important is that unlike the main effects which were entirely consistent from one sample to another, the "significant" inter-

actions were not the same in the three studies.

To recap, then, in causal terms our interest was in the question of whether IQ differences among children were attributable directly to maternal age or whether the observed maternal age effects were accounted for by associated variables such as maternal education. Figure 1 gives the results of these investigations. Rather to our surprise, the unique effect of teenaged mother disappeared (or, more strictly, was opposite in Cycle II and III and not significant in the CPP which was the largest sample). What did appear was a straight linear effect of maternal age, amounting to about 1 IQ point for every 5 or 6 years of maternal age. This was consistent across the three studies and showed no tendency to decline at the oldest ages.

With this as background let us turn to the behavioral data. Cycles II and III were never designed to produce extensive data in this area. Thus the interviewed guardian, the school, and the youth seem to have been asked a hodgepodge of questions ranging from presumed maladaptive behavior to values to sleeping over at friends. Given the known unreliability of individual items and the sheer impossibility of digesting so much data we undertook a factor analysis of each of several sets of data as an empirical guide to meaningful and reliable scores. Without going into details here let me just say that we partialled age, sex and their interaction from each of the items prior to the factoring in order to avoid getting factors distinguishing purely along these lines.

Table 4 presents the factors obtained from the Cycle II interview of the guardian as well as three scores based on

content grouping 12 school report items. The parent report scores are based on 29 items of 47 originally entered in the factor analysis. As can be seen they are of very modest reliability for the most part, although the Cronbach alphas computed are likely to be lower bound estimates. Keeping in mind that the children are ages 7 through 11, I will try to give you an idea of illustrative items. Social participation includes having attended nursery school or kindergarten, membership in clubs, sports activities and time spent with friends. Management problems include problems adjusting to first grade and nervousness. Sleep disturbances include nightmares and trouble getting to bed. Responsibilities include caring for pets, if any, and other regular chores. Eating patterns include eating with family rather than alone and not being a fussy eater. Sociability includes having many friends and getting along well with other children. The means in the table refer to these scales transformed to be comparable in units to the intelligence scale for ease of comparison. All differences reported are statistically significant ($p < .05$). Children of teenaged mothers tended to participate in fewer activities, present more management problems and have more sleep disturbances. They were also likely to have more home responsibilities and to have more positive eating patterns; however differences between children of teenaged mothers and those of mothers in their twenties were no greater than between children of women in their twenties and those in their thirties. Altogether it should be noted that these differences are much smaller than

the observed IQ differences, with the exception of the social participation measure. This decrease in magnitude is only partly explained by their lower reliabilities. The sociability score was unrelated to maternal age.

Turning to the school report we have comparable findings. Children of teenaged mothers were reported by the school as having slightly more attention problems, problems relating to peers, and as more likely to be a discipline problem.

Table 5 presents comparable data from Cycle III for youth, of ages 12-18. In this case there were three sources of data; parent, youth and school. Aspiration-independence includes educational aspirations and expectations, and independence of decisions about the youth's life. Paid employment refers to after school and during vacations. The youth reported problems include sleeping problems, nightmares and nervousness. The delinquency measure includes police contacts, arrests, smoking and running away from home. The school problems score includes need for frequent disciplinary action, and poor adjustment. Parent reported problems include difficulty in making friends, trouble to bring up, and nervousness. As can be seen the school and youth agreed that children of teenaged mothers have more problems. They also had lower aspirations and were more likely to be employed after school. They were also more likely to show delinquent tendencies; however, this was part of an overall linear association which continued for children of mothers of older ages. Teenaged mothers were not likely to report their now teenaged children as having problems than were older mothers.

Having thus found some significant though small relationship with maternal age for 13 of 15 measures of the youth's characteristics or behavior, we wished again to determine whether these effects were independent of the social disadvantages associated with teenaged motherhood as reflected in our other independent variables. These findings are presented in Table 6. In this table I have summarized the findings for the behavioral measures for Cycle II and III and added the IQ scores for comparability. As can be seen, most of the behavioral measures are only very modestly related to the sociodemographic variables, if at all, in marked contrast to the intelligence measure. Two measures are, not surprisingly, exceptions to this tendency, social participation and aspirations. Of the 13 behavioral measures showing a zero order relationship to maternal age only six appear to have a direct effect and only two of these show a specific effect of teenaged motherhood. Teenaged mothers appear to have children less involved in formal and informal social activities than children of other mothers, even within groups of comparable sociodemographic status. Second, the schools report the teenaged children of teenaged mothers to have more problems than other children of comparable socio demographic status. In addition the children of older mothers tended to have higher aspirations, the elementary age children of older mothers had fewer reported attention problems in school, and the children of young mothers were given more responsibilities and were more likely to have good eating patterns.

In sum, the children of teenaged mothers are at a small disadvantage, not only intellectually but behaviorally as well.

Many of these differences are accounted for by the social and demographic conditions associated with young motherhood. Others appear to be additionally attributable to immaturity of some kind, in that they gradually diminish with older mothers. Thus, these data suggest that eliminating the social disadvantage of teenaged motherhood might not entirely eliminate the differences amoung children born to mothers of differing ages.

It is interesting to speculate on the origins of the two apparent direct effects of teenaged motherhood -- lesser social participation of their elementary school children and more problems reported by the school when their children are adolescent. The social participation variable was the most strongly related to the socio-economic-demographic variables of any of the variables and may reflect otherwise unmeasured aspects of social class. The school problems of the youth who are offspring of teenaged mothers are not likely to be attributable to social class which is only modestly related to this variable. Furthermore, this difference is not accounted for by differences in intelligence (analyses not shown). If, as these analyses suggest, this difference turns out in other investigations to be associated with teenage motherhood per se rather than lesser maturity in general, the possibility arises that these nonacademic school problems in the offspring were preceded by comparable problems in the mothers which led them to favor early pregnancy. Such a speculation deserves further investigation.

Table 1

Data Sources

	Health Examination Survey		
	Cycle II	Cycle III	CPP
N used	6577	5942	26133
Age Range (yrs.)	6-11	12-17	6-8
Years of Birth	1952-1959	1949-1958	1959-1965
Years of Data Collection	1963-1965	1966-1970	1966-1973

Table 2

Mean IQ scores for Maternal Age Groups

Mother's Age at Birth (white children only)	Mean IQ		
	Cycle II (N)	Cycle III (N)	CPP (N)
14-17	97.1 (153)	94.8 (154)	99.2 (746)
18-19	98.6 (392)	100.6 (360)	101.4 (1753)
20-24	101.9 (1742)	102.0 (1517)	104.6 (4844)
25-29	103.7 (1606)	103.2 (1552)	104.6 (2796)
30-34	104.2 (1118)	103.8 (977)	102.3 (1514)
35-39	103.9 (540)	102.5 (447)	102.5 (825)
40-44	101.4 (136)	102.7 (110)	102.2 (222)
Total	102.7	102.4	103.4

Table 3

Independent variable sets

	# of variables
Region of country	3
Community characteristics (e.g. urban-rural)	5
Characteristics of child (age, Sex, Race, Twin)	4
Family structure (2 parents, mother only etc.)	5
Family size, birth order	3
Education of Parents or Guardians	4
Family income	3
Employment of Parents or Guardians	4
Maternal Age	4

Table 4

Behavior and Maternal age: HES Cycle II

	Mother's age		
Parent report (N=6577)	Under 18	18-19	20+
Social Participation (.87)	94.5	98.2	102.0
Management Problems (.50)	101.7	100.2	98.8
Sleep Disturbances (.48)	101.0	100.2	99.3
Responsibilities (.42)		(-.20 per year)	
Positive Eating Patterns (.39)		(-.18 per year)	
Sociability (.38)	---	---	---
School report (N=4335)			
Attention Problems (2 items)	100.6	99.5	98.4
Peer Problems (5 items)	100.5	99.8	99.1
Discipline Problems (4 items)	100.5	99.4	98.4

Table 5

Behavior and Maternal Age: HES Cycle III

	Mother's age		
Youth report	Under 18	18-19	20+
Aspiration-independence (.57)	96.8	98.7	100.5
Paid employment (.71)	101.6	100.6	99.6
Problems (.39)	101.4	100.6	99.8
Delinquent Tendency (.64)		(-.074 per year)	
School			
Problems sum (.43)	103.0	100.8	98.5
Parent			
Problems (.50)		----------	

Table 6

Maternal Age Variables with Significant Effects in the Multiple Regression

Cycle II	R^2	Teen	MA	Cycle III	R^2	Teen	MA
Parent				Youth			
Social Participation	.43	—		Aspirations	.23		+
Management Problem	.02			Paid Employment	.16		
Sleep Disturbance	.02			Problems	.04		
Responsibilities	.05		--	Delinquent Tendency	.14		
Eating pattern	.04		--	Parent			
Sociability	.01			Problems	.02		
School				School			
Attention Problem	.09		—	Problems	.07	+	
Peer Problem	.07			IQ	.38		+
Discipline Problem	.11						
IQ	.38		+				

* A minus sign indicates a significant negative effect of the variable whereas a + sign indicates a significant positive effect. ($P > .05$)

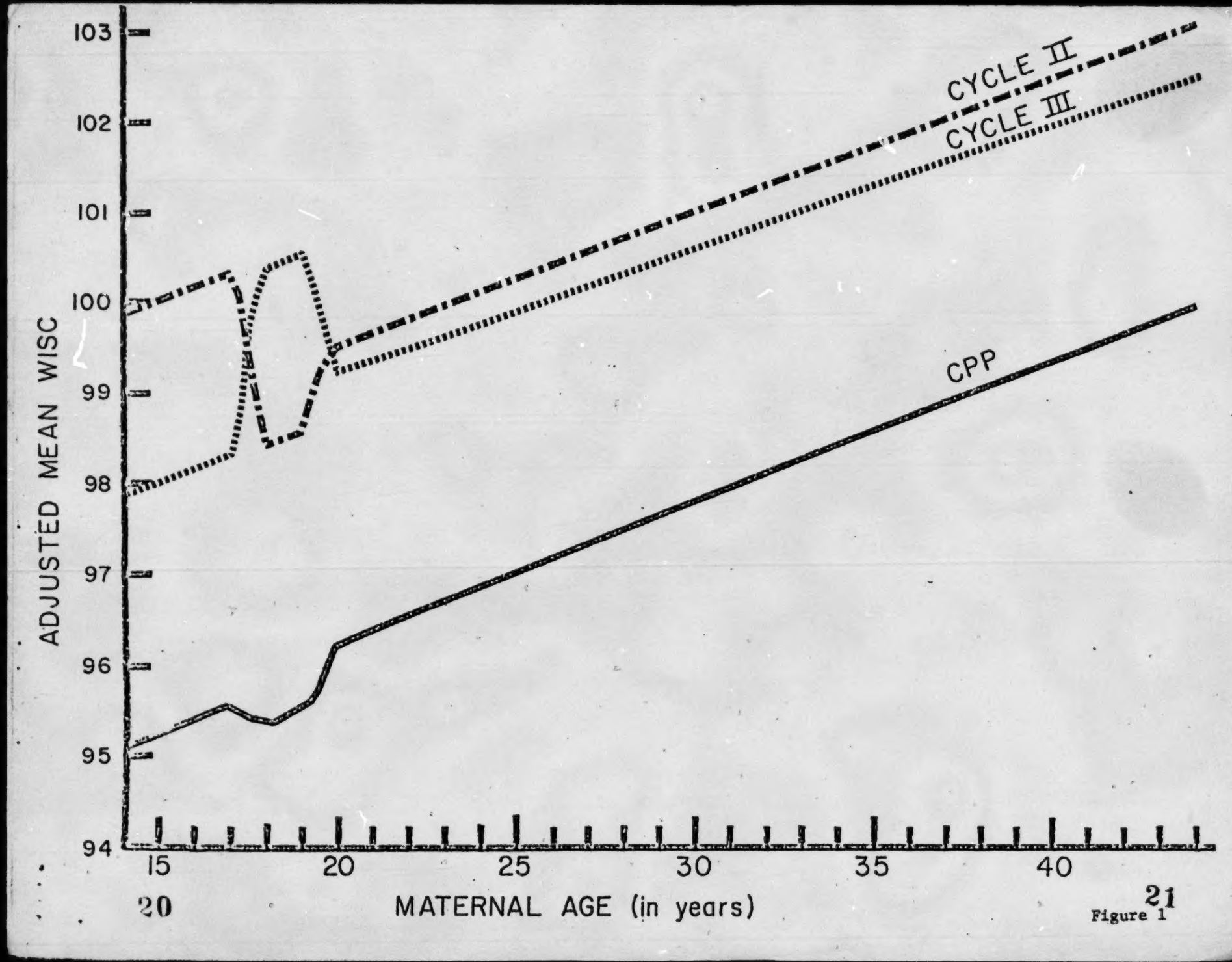
103
102
101
100
99
98
97
96
95
94
ADJUSTED MEAN WISC
CYCLE II
CYCLE III
CPP
15
20
25
30
35
40
MATERNAL AGE (in years)

Figure 1